

CLAIMS

What is Claimed is:

1. A method, comprising the steps of:

driving a fluid into a process unit through utilization of a propulsion unit operating in a process mode;

performing a process in the process unit utilizing the fluid;

setting the propulsion unit to operate in a recycle mode; and

driving fluid contaminated by the process into a recycling unit through utilization of the propulsion unit operating in the recycle mode.

2. The method of claim 1, further comprising the step of:

collecting contaminated fluid from the process unit in a collection unit.

3. The method of claim 2, wherein the step of setting the propulsion unit to operate in a recycle mode comprises the step of:

setting a first control valve and a second control valve to a recycle mode position.

4. The method of claim 3, wherein the step of setting the first control valve and the second control valve to a recycle mode position comprises the steps of:

positioning a first port opening of the first control valve in alignment with plumbing that couples the first control valve to an inlet of a pump,

positioning a second port opening of the first control valve in alignment with plumbing that couples the first control valve to an outlet of the collection unit,

positioning a first port opening of the second control valve in alignment with plumbing that couples the second control valve to an outlet of the pump, and

positioning a second port opening of the second control valve in alignment with plumbing that couples the second control valve to an inlet of the recycling unit.

5. The method of claim 2, wherein the step of collecting comprises the step of:

permitting the force of gravity to propel the contaminated fluid from the process unit into a fill line, and

receiving the contaminated fluid through the fill line.

6. The method of claim 5, wherein the step of driving fluid contaminated by the process comprises the steps of:

driving the contaminated fluid into a recycling unit that concentrates the contaminated fluid by removing purified fluid from the contaminated fluid, and

directing the purified fluid through a permeate line into the process unit.

7. The method of claim 6, wherein the step of driving fluid contaminated by the process comprises the step of:

circulating the contaminated fluid from the collection unit through the first control valve, through the pump, through the second control valve, to a membrane module, and back into the collection unit.

8. The method of claim 1, further comprising the step of:

setting the propulsion unit to operate in a process mode.

9. The method of claim 8, wherein the step of setting the propulsion unit to operate in the process mode comprises the step of:

setting a first control valve and a second control valve to a process mode position.

10. The method of claim 9, wherein the step of setting the first control valve and the second control valve to the process mode position comprises the steps of:

positioning a first port opening of the first control valve in alignment with plumbing that couples first control valve to an outlet of the process unit,

positioning a second port opening of the first control valve in alignment with plumbing that couples the first control valve to an inlet of a pump,

positioning a first port opening of the second control valve in alignment with plumbing that couples the second control valve to an inlet of the process unit, and

positioning a second port opening of the second control valve in alignment with plumbing that couples the second control valve to an outlet of the pump.

11. The method of claim 10, wherein the step of driving the fluid comprises the step of:
circulating the fluid from the process unit through the first control valve, through the pump, through the second control valve, and back into the process unit.

12. The method of claim 8, wherein the step of driving the fluid comprises the step of:
driving the fluid into the process unit with a single pump.

13. The method of claim 12, wherein the step of driving the fluid contaminated by the process comprises the step of:

driving the fluid contaminated by the process into the recycling unit with only the single pump.

14. The method of claim 1, further comprising the step of:
collecting contaminated fluid in a vent pipe.

15. The method of claim 14, further comprising the step of:
removing the contaminated fluid from the vent pipe through utilization of a suction device.

16. The method of claim 14, further comprising the step of:

removing the contaminated fluid from the vent pipe through utilization of a valve.

17. A system comprising:

a process unit in which a process is performed that utilizes a liquid;

a recycling unit that recycles fluid contaminated by the process; and

a propulsion unit coupled to the process unit and the recycling unit that is adjustable between a process mode for driving the liquid into the process unit and a recycle mode for driving contaminated fluid into the recycling unit.

18. The system of claim 17, further comprising:

a collection unit coupled to the process unit that collects contaminated fluid from the process unit.

19. The system of claim 18, wherein the propulsion unit comprises:

a pump,

a first control valve, having a recycle mode position and a process mode position, coupled through a first length of plumbing to an outlet of the process unit, coupled through a second length of plumbing to an inlet of the pump, and coupled through a third length of plumbing to an outlet of the collection unit, and

a second control valve, having a recycle mode position and a process mode position, coupled through a fourth length of plumbing to an inlet of the process unit, coupled through a fifth

length of plumbing to an outlet of the pump, and coupled through a sixth length of plumbing to an inlet of the recycling unit.

20. The system of claim 19, wherein the first control valve and the second control valve each include a first port opening and a second port opening.

21. The system of claim 20, wherein the first control valve is set to recycle mode through alignment of the first port opening of the first control valve with the second length of plumbing and alignment of the second port opening of the first control valve with the third length of plumbing, and the second control valve is set to recycle mode through alignment of the first port opening of the second control valve with the fifth length of plumbing and alignment of the second port opening of the second control valve with the sixth length of plumbing.

22. The system of claim 20, wherein the first control valve is set to process mode through alignment of the first port opening of the first control valve with the first length of plumbing and alignment of the second port opening of the first control valve with the second length of plumbing, and the second control valve is set to process mode through alignment of the first port opening of the second control valve with the fourth length of plumbing and alignment of the second port opening of the second control valve with the fifth length of plumbing.

23. The system of claim 18, further comprising:

a fill line that connects the process unit to the collection unit, wherein the collection unit collects contaminated fluid through the fill line.

24. The system of claim 23, wherein the collection unit comprises a tank that is positioned gravitationally lower than the process unit and receives contaminated fluid from the process unit through the force of gravity directing the contaminated fluid through the fill line.

25. The system of claim 17, wherein the recycling unit comprises:

a membrane module.

26. The system of claim 25, wherein the membrane module is coupled to the process unit through a permeate line.

27. The system of claim 17, wherein the propulsion unit comprises:

a single pump that is the only pump in the propulsion unit.

28. A method, comprising the steps of:

driving a fluid into a process unit through utilization of a propulsion unit operating in a process mode;

performing a process in the process unit utilizing the fluid;

collecting fluid contaminated by the process in a collection unit;

setting the propulsion unit to operate in a recycling mode through setting a first port opening of a first control valve in alignment with plumbing that couples the first control valve to an inlet of a pump, setting a second port opening of the first control valve in alignment with plumbing that couples the first control valve to an outlet of the collection unit, setting a first port

opening of the second control valve in alignment with plumbing that couples the second control valve to an outlet of the pump, and setting a second port opening of the second control valve in alignment with plumbing that couples the second control valve to an inlet of a recycling unit; and

utilizing the propulsion unit to drive contaminated fluid through the recycling unit to remove purified fluid from the contaminated fluid, to direct the purified fluid through a permeate line into the process unit, and to direct the contaminated fluid back into the collection unit.